

Index of Contributors

Agrawal, S., 2-10, 318-320, 321-323
 Alder, H., 64-69, 209-218
 Ansonge, W., 295-297
 Aurelian, L., 159-177

Banerjee, A. C., 271-273
 Barger, S. W., 219-230
 Barja, P., 288-290
 Baserga, R., 1, 64-69
 Belinsky, M. G., 277-279
 Bennett, C. F., 306-309
 Bergot, B. J., 310-312
 Birnstiel, M. L., 136-153
 Blumenfeld, M., 336-338
 Bradley, M. O., 124-135
 Britton, D. H. O., 265-267
 Brocard, M.-P., 77-87

Calabretta, B., 117-123
 Caracciolo, D., 117-123
 Carr, B. I., 315-317
 Caskey, C. T., 154-158
 Chang, E., 159-177
 Chatterjee, S., 95-106
 Chen, C.-J., 271-273
 Cho, K. R., 283-285
 Chuang, T. T., 326-327
 Cohen, J. S., 315-317
 Cook, P. D., 306-309
 Cooke, B. A., 291-292
 Cosenza, S. C., 231-239
 Cotten, M., 136-153
 Coulson, J., 339-341
 Couvreur, P., 334-335
 Cowser, L., 306-309
 Crisell, P., 274-275
 Curiel, D. T., 136-153

Degols, G., 331-333
 Delohery, T., 313-314
 Denhardt, D. T., 70-76, 280-282, 342-346
 Dinter-Gottlieb, G., 277-279
 Dritschilo, A., 300-302

Ecker, D. J., 306-309
 Elkins, D., 95-106

Fahmy, B., 37-44
 Feng, B., 280-282
 Ferrari, S., 11-26
 Fields, S., 313-314
 Freire-Moar, J., 288-290

Ge, L., 263-264
 Gervasoni, J., 313-314
 Gewirtz, A. M., 178-187
 Ghosh, K., 315-317
 Graeven, U., 293-294
 Grande, A., 11-26
 Green, D. R., 193-203
 Grunwald, D., 77-87
 Guinasso, C. J., 306-309

Haglund, K., 271-273
 Harel-Bellan, A., 27-36
 Harmison, G. G., 271-273
 Helene, C., 27-36
 Herlyn, M., 293-294
 Ho, S. P., 265-267
 Holt, J. T., 88-94
 Homann, M., 268-270

Imbach, J. L., 334-335
 Inagaki, M., 315-317

Jacobs-Lorena, M., 204-208
 James, W., 274-275
 Jimenez, G., 107-116
 Johnson, L. K., 306-309

Khochbin, S., 77-87
 Knecht, D. A., 45-56
 Koizumi, M., 276
 Kraynak, A. R., 124-135
 Krishna, S., 313-314

Lavignon, M., 334-335
 Lawlor, K. G., 283-285
 Lawrence, J.-J., 77-87
 Lebleu, B., 331-333
 Ledwith, B. J., 124-135
 Leonetti, J.-P., 331-333
 Lescure, F., 336-338
 Lin, D., 209-218
 Lin, J.-C., 107-116
 Lorenz, P., 295-297

Malcolm, A. D. B., 339-341
 Malvy, C., 334-335
 Manam, S., 124-135
 Manfredini, R., 11-26
 Manoharan, M., 306-309
 Matthieu, J.-M., 188-192
 McGee, D. P. C., 306-309
 Mercer, W. E., 209-218
 Metelev, V., 321-323

Miller, P. S., 159-177
Misiura, K., 321-323

Narayanan, R., 283-285
Neckers, L., 37-44
Nichols, W. W., 124-135
Nishikura, K., 240-250

Ogawa, S., 298-299
Ohtsuka, E., 276
Olazábal, U. E., 298-299
Osborne, M. P., 283-285

Pagano, J. S., 107-116
Pawlita, M., 268-270
Pepperkok, R., 295-297
Pestka, S., 251-262
Pfaff, D. W., 298-299
Phillips, S., 136-153
Pietrkowski, Z., 64-69
Plank, C., 136-153
Postel, E. H., 57-63
Prasad, Y., 277-279
Price, C. M., 328-330
Pyerin, W., 295-297

Raab-Traub, N., 107-116
Ramasamy, K., 306-309
Reiss, K., 64-69
Rhodes, A., 274-275
Rittner, K., 268-270
Roach, A., 188-192
Rodeck, U., 293-294
Ropert, C., 334-335
Rosolen, A., 37-44
Rossi, J. J., 95-106
Rotenberg, S., 313-314

Sarin, P. S., 2-10
Schaapveld, R. Q., 283-285
Scherzinger, C. A., 45-56
Schubert, M., 271-273
Sczakiel, G., 268-270
Seitz, A. W., 263-264
Shi, Y., 193-203
Shields, M. T., 209-218
Shillito, E. J., 286-287
Shudo, K., 324-325
Skorski, T., 117-123
Smith, J. B., 277-279
Soprano, D. R., 231-239
Soprano, K. J., 231-239

Springer, R. H., 306-309
Steele, C., 286-287
Stein, C. A., 313-314
Stein, S., 303-305
Steinlein, P., 136-153
Sun, D., 2-10
Sung, N. S., 107-116
Surmacz, E., 64-69
Szczylik, C., 117-123

Tang, J. Y., 2-10, 318-320
Taub, R., 313-314
Taylor, N. R., 95-106
Telang, N. T., 283-285
Temsamani, J., 318-320
Thierry, A. R., 300-302
Thill, G., 336-338
Thomas, L. L., 328-330
Thuong, N. T., 27-36
Togawa, K., 315-317
Tonkinson, J., 313-314
Torelli, U., 11-26
Tosic, M., 188-192
Ts'O, P. O. P., 159-177
Tsutsumi, A., 288-290
Tung, C.-H., 303-305

Ullrich, S. J., 209-218

Valtieri, M., 117-123
Van Eldik, L. J., 219-230
Vasseur, M., 336-338
Venturelli, D., 117-123
Vickers, T., 306-309
Vogelstein, B., 283-285

Wagner, E., 136-153
Weinmann, R., 293-294
Welsh, M. J., 219-230
West, A. P., 291-292
Whitesell, L., 37-44
Wong, K. K., 95-106

Yates, A. A., 45-56
Yumet, G., 231-239

Zaia, J. A., 95-106
Zamecnik, P. C., 2-10
Zatloukal, K., 136-153
Zhang, L. M., 313-314
Zheng, H., 193-203
Zon, G., 310-312

Subject Index

- A**deno-associated virus (AAV), in anti-HIV therapy, 101-104, 343
- Adenovirus, in transfection, 137-141, 143-152
- AIDS, 107, 193, 268, *See also* HIV
- antisense strategy and, 345, *See also* HIV
- antisense treatment and, 2, 8-10
- oligonucleotide analogs in, 318-320
- cAMP production, antisense DNA and, 291-292
- Anticodon strategy, *See* Antisense strategy
- Antisense antiviral activity, 2, 5-10, 268-270, *See also* Antisense DNA; Antisense oligonucleotides; Antisense RNA
- Antisense cloning strategy, 90-92
- Antisense DNA, 1, 209, 212-217, *See also* Antisense oligonucleotides; Antisense RNA
- as anti-HIV agent, 2, 8-10
- as antiviral agent, 339-341
- to bFGF, 293-294
- in bone marrow purge, 178-186
- and cAMP production, 291-292
- and cell cycle inhibition, 64-68
- and cell cycle regulation, 231, 233-239
- and cell proliferation, 233-239
- chemotherapeutic activity of, 1 and CKII, 295-297
- and DNA synthesis, 231, 234-235, 237-239
- in gene characterization, 11-12
- and growth stimulation inhibition, 295-297
- and HIV replication, 2, 5-10
- HL60 cells, interaction with, 313-314
- in human leukemia therapy, 178-186
- and IGF-1 receptor role, 64-68
- and LH receptors, 291-292
- liposomal delivery of, 300-302, 343
- nuclease-resistant, 2
- and protooncogenes, 37-43, 231-239
- reliability of, 1, 67-68, 101
- and S100 β , 220-228
- and T-cell gene function, 193-202
- Antisense inhibition, *See also* Antisense DNA; Antisense oligonucleotides; Antisense RNA
- of DNA synthesis, 65
- of β -galactosidase, 252-261
- of gene expression, 42-56, 160-161, 172-175, 188-190, 204-207
- gene portion effect on, 47-48
- of HIV, 2, 5-10, 268-270
- of oncogenes, 11-14, 37-43
- of phenotype transformation, 286-287
- reversion of, 49-50
- of RSV, 9
- sense orientation transformants and, 50-54
- sequence size effect on, 48-49
- Antisense mRNA, 255-260
- Antisense oligodeoxynucleotides, *See* Antisense DNA
- Antisense oligomers, *See* Antisense oligonucleotides
- Antisense oligonucleotides, *See also* Antisense DNA; Antisense RNA; Matagens; Oligonucleotide analogs
- antiviral activity of, 331
- cell cycle effects of, 212-217
- in EBV episome disruption, 108-111
- Friend retrovirus inhibition by, 334-335
- as gene expression inhibitors, 42-43
- in hepatoma cell physiology, 315-317
- and HPV, 339-341
- improving uptake of, 306-309
- intracellular targeting of, 326-327
- and latent EBV infection, 107-108
- modifications of, 306-309
- and neuroectodermal tumors, 37-42
- oncogene inhibition by, 37-43
- and p34 protein function, 209-217
- to PR, 298-299
- sequence-specific activity of, 331-333
- Antisense oligoribonucleotides, *See* Antisense RNA
- Antisense oncogene, in transformation reversal, 124-134
- Antisense promoter mapping, 88-90, 92
- Antisense RNA, 157-160, 209, 342, *See also* Antisense DNA; Antisense oligonucleotides
- anti-HIV activity of, 2, 5-10
- and DCC gene, 283-285
- in fibroblast transformation, 283-285
- and β -galactosidase synthesis, 252-261
- history/perspective, 251-261
- and p53 regulation, 77-87
- and phenotype transformation, 286-287
- phosphorothioate analogs of, 2-10
- and PKC isoenzymes, 288-289
- dsRNA unwinding/modifying activity and, 248-249
- mRNA translation blockage by, 11-12, 251-252
- splicing inhibition by, 70-72
- synthesis of, 2-3, 7-10
- and target RNA levels, 73-75
- and T-cell activation, 288-289

- and TIMP expression, 70-72
- variables affecting activity of, 47-49
- Antisense RNA inhibition
 - of β -galactosidase, 255-260
 - of gene expression, 204-207
 - of genes, 45-56, 188-190
 - of HIV, 268-270
 - mechanism of, 70-76
 - of protooncogene expression, 128-132
 - and target RNA concentration, 73-75
 - of TIMP gene, 280-282
 - at transcription level, 70-72
 - at translation level, 72-73
 - at transport level, 72
 - of tumorigenicity, 127-128
- Antisense sequences, 1
 - and cell proliferation, 12-14
 - and gene inhibition, 11-14
- Antisense strategy
 - and AIDS, 2, 8-10, 318-320, 345
 - in antiviral treatment, 101-102, 164-167, 339, 341, 345
 - and cell cycle control, 64-68
 - cloning method in, 90-92
 - cornerstones of, 160-161
 - and differentiation, 154-158
 - in gene characterization, 1, 11-14, 16-22, 154-158
 - gene expression control by, 27-35
 - and glial cell function, 219-228
 - and molecular problems, 1
 - oligonucleotide backbone construction, 161-163
 - in oncogene suppression, 167-168
 - in TCR studies, 193-201
 - and viral gene function, 164-167
 - and virus replication, 345
- Antisense treatment
 - and AIDS, 2, 8-10, *See also* HIV
 - for EBV, 107, 111-115
 - of transformed cells, 124-134
- Antiviral research
 - anticode mechanism in, 166
 - anticode specificity in, 164-166
- Matagens in, 164-166
- Apoptosis
 - gene control of, 14
 - protooncogenes and, 19-20, 194-197, 201
 - of T cells, 193-197

Basic fibroblast growth factor (bFGF), 293-294

- Bone marrow purge
 - antisense DNA in, 178-186
 - efficiency of, 185-186
 - protooncogenes in, 185
- Burkitt's lymphoma, 107, 109

- C**ancer, multidrug resistance in, 300-302
- Casein kinase II
 - in cell growth stimulation, 295-297
 - and EGF mitogenic effect, 344
- Cell cycle, *See also* Cell proliferation;
 - Differentiation; Hematopoiesis
 - antisense DNA and, 64-68, 231, 233-239
 - antisense strategy and, 64-68, 212-217
 - genetic regulation of, 231-239
- Cell proliferation, *See also* Cell cycle;
 - Differentiation; Hematopoiesis
 - antisense DNA and, 233-239
 - antisense sequences and, 12-14
 - and differentiation potential, 14-16
 - IGF-1 receptor role in, 64-68
 - and myeloid differentiation, 14-16
 - oncogenes and, 12-16
 - protooncogenes in, 12-13, 124

Deleted in colorectal cancer (DCC) gene, 283-285, 343

- Differentiation, *See also* Cell cycle; Cell proliferation; Hematopoiesis; Myeloid differentiation
 - antisense strategy and, 154-158
 - genes in, 11-22
 - in leukemic cell lines, 14-16
 - in neuroectodermal cells, 37-43
 - p53 regulation in, 77-87
 - and proliferative capacity, 14-16
 - protooncogenes in, 16-22, 124
- DNA, 42, *See also* Antisense DNA
 - duplexes, 4, 159-160
 - enatio-/meso- forms, 324-325
 - receptor-mediated endocytosis of, 136-138, 343-344
 - transfection with, 343
 - in transferrinfection, 136-138, 141-152
 - in triplex formation, 1, 27-35, 342

- DNA synthesis
 - antisense DNA and, 231, 234-235, 237-239
 - inhibition of, 65
- Duplex formation, 255-256
- DNA in, 4, 159-160
 - oligonucleotides in, 4-5, 159, 172-175
 - RNA in, 12, 240-249

Endocytosis

- DNA importation via, 136-138
- Epstein-Barr virus (EBV)
 - antisense treatment for, 107, 111-115
 - disease associations, 107-108
 - latent infection, 107-108
 - replication of, 108
- Epstein-Barr virus (EBV) episome
 - disruption of, 108-111

in EBV-immortalized cells, 107, 111-115
and latent infection, 108

Fibroblast growth factor, *See* Basic fibroblast growth factor

Fibroblast transformation, 283-285

β -Galactosidase synthesis
anti-mRNA inhibition of, 255-260
antisense blockage of, 252-261

Gene characterization
antisense DNA in, 11-12
antisense strategy in, 1, 11-14, 16-22, 154-158

Gene expression
antisense inhibition of, 42-56, 160-161, 172-175, 280-282
antisense RNA inhibition of, 188-190, 204-207
antisense strategy in, 27-35

Genes, *See also* Oncogenes; Protooncogenes
antisense inhibition of, 11-14, 72-73
in apoptosis, 14
in cell cycle regulation, 231-239
in differentiation, 11-22
RNA virus, 247
role in myeloid differentiation, 11-14, 16-22

Gene therapy, 343

Glial cell protein (S100 β), 219-221
function, 222-228

Glioblastoma cells, p34 protein expression
in, 210-212

Hematopoiesis, 180-181, 195, *See also* Cell cycle; Cell proliferation; Differentiation
leukemic, 182-185
protooncogenes in, 117-122, 180-185, 344

Hepatitis delta RNA, 277-279

Hepatitis delta virus (HDV) ribozyme, 336-338

Hepatoma cell physiology, antisense TGF- β
in, 315-317

Herpes simplex virus (HSV), 164-167
Matagens and, 172-175, 345

HIV, *See also* AIDS
AAV therapy for, 101-104
antisense inhibition of, 2, 5-10, 268-270
antisense RNA and, 2, 5-10
ribozyme cleavage of, 265-267
ribozyme inhibition of, 101-104

HIV replication
antisense DNA and, 2, 5-10
antisense RNA inhibition of, 268-270, 274
gene inhibition of, 274-275

ribozyme inhibition of, 101-104, 271-275

Hoogsteen, *See* Triplex orientation

HPLC
in analysis of oligonucleotides, 321-323
in separation of oligonucleotide analogs, 310-312

HPV-18, *See* Human papillomavirus

Human immunodeficiency virus, *See* HIV

Human papillomavirus (HPV)
antisense oligonucleotides and, 339-341
and neuroendocrine tumors, 37-43, 344
in phenotype transformation, 286-287
strains of, 339

IGF-1, *See* Insulin-like growth factor I

Inhibin
regulated expression of, 263
ribozyme and, 263

Insulin-like growth factor I (IGF-1), 64-68

Leukemia, chronic myelogenous, 182

Leukemia therapy
antisense DNA in, 178-186
protooncogenes in, 178-186

Leukemic cell lines, *See also* Murine erythroleukemia; Myeloid leukemic cells
differentiation in, 14-16
in hematopoiesis, 182-185, 344

Liposomal delivery, of antisense DNA, 300-302, 343

Luteinizing hormone (LH) receptors, antisense DNA and, 291-292, 344

Matagens, 159, 163, 345, *See also* Antisense strategy; Oligonucleotide analogs
in animal experimentation, 166-167
anti-HSV specificity of, 164-166, 172-175
mechanism of, 166
potency enhancement, 168-172
in triplex formation, 159, 172-175

Melanoma cells
phenotype reversal in, 78-87
transfection of, 293-294

Murine erythroleukemia (MEL) cell lines, 77, 79, 81-87

Myeloid differentiation, *See also* Differentiation
cell proliferation and, 14-16
c-fes in, 16-21
oncogenes in, 11, 16-22
PKC in, 20
protogene products in, 20-22

Myeloid leukemic cells, 344

Neuroendocrine tumors, antisense oligonucleotides and, 37-43, 343

Oligodeoxynucleotides, *See* Antisense DNA

Oligonucleotide analogs, *See also* Antisense DNA; Antisense oligonucleotides; Antisense RNA; Matagens
in AIDS chemotherapy, 318-320
anti-HIV activity of, 2, 5-10, 318-319
backbone construction of, 161-163
in chemotherapy, 1
in duplex/triplex formation, 28-32, 159, 172-175
HPLC separation of, 310-312
nuclease-resistance of, 163, 310, 343
RNA duplexes with, 4-5
synthesis of, 4

Oligonucleotide phosphorothioates, *See also* Oligonucleotide analogs
in AIDS chemotherapy, 318-319
cellular uptake/degradation of, 328-330
end-capped, 318-319

Oligonucleotides, *See also* Antisense DNA; Antisense RNA; Matagens
HIV inhibition by, 9-10
RSV inhibition by, 9
triple helix formation by, 27-32

Oligoribonucleotides, *See* Antisense RNA

Oncogenes, *See also* Protooncogenes
antisense inhibition of, 11-14, 37-43
antisense strategy and, 167-168
and cell proliferation, 12-16
in myeloid differentiation, 11, 16-22
in phenotype reversal, 124-134

Oncogene transcription
antisense inhibition of, 88-92
triplex formation and, 57-63

P₃₄ protein
antisense oligonucleotides and, 209-217
in glioblastoma cells, 210-212

p53 protein
antisense RNA and, 77-80
in B16 cells, 78-87
and differentiation, 77, 81-87
in MEL cells, 77, 79, 81-87

Papilloma virus-transformed cells, 286-287,
See also Human papillomavirus

Phenotype reversal, 124-134

Phenotype transformation
antisense RNA and, 286-287, 343
human papillomavirus in, 286-287

Phosphorothioate, *See* Oligonucleotide phosphorothioates

PKC, *See* Protein kinase C

Polycythemia vera, 182

Progesterone receptor (PR) mRNA
antisense to, 298-299

and rat mating behavior, 298-299

Protein kinase C (PKC)
in myeloid differentiation, 20
in oligonucleotide uptake, 343

Protein kinase C (PKC) isoenzymes
antisense RNA and, 288-289
in T cells, 288

Protein synthesis inhibition, 255-261

Protooncogenes, *See also* Oncogenes
in antileukemia therapy, 178-186
antisense DNA and, 37-43, 231-239
and apoptosis, 19-20, 194-197, 201

in bone marrow purge, 185
in cell cycle regulation, 231-239
in cell proliferation, 12-13, 124
in differentiation, 16-22, 124
in hematopoiesis, 117-122, 180-185, 344
in vitro suppression of, 37-41
in vivo suppression of, 41-42
in leukemic hematopoiesis, 182-185
in macrophage suppression, 14
in neuroectodermal cell differentiation, 37-43

ribozyme inhibition of, 276
transcription modulation, 57-63
in transformation reversal, 124-134
triplex formation and, 57-63

Receptor-mediated endocytosis, 136-138,
343-344

Retinoblastoma, 37

Ribonuclease mimics, 303-305

Ribozymes, 1, 27, 251

efficiency of, 98-101

hammerhead, 97-101, 343

of HDV, 336-338

and HIV, 265-267

HIV inhibition by, 101-104, 271-273

and inhibin cleavage, 263

and mRNA cleavage, 263, 276

protooncogene inhibition by, 276

types of, 95-98

RNA

messenger, *See* mRNA

synthetic ribonuclease cleavage of,
303-305

RNA

antigenomic, 277-279

double-stranded, *See* dsRNA

hepatitis delta, 277-279

oligonucleotide duplexes of, 4-5, 7

oligonucleotides complementary to, 1

self-cleaving, *See* Ribozymes

- RNA duplexes
 dsRNA unwinding/modifying activity and, 240-249
 in translation blockage, 12
- dsRNA
 in protein synthesis blockage, 255-260
 in vivo modification of, 240-243
- dsRNA unwinding/modifying activity and antisense RNA, 248-249
 biological function of, 245
 cloning of, 248
 distribution of, 244-245
 in mammalian cells, 240
 nuclear localization of, 243-244
 and mRNA, 247-248
 dsRNA alteration by, 242-243
 and dsRNA duplexes, 240-249
 and RNA virus genes, 247
 specificity of, 242
- mRNA
 antisense RNA blockage of, 11-12, 251-252
 and antisense RNA gene inhibition, 54-55
 dsRNA unwinding/modifying activity and, 247-248
 and p53 regulation, 77-87
 in protein synthesis inhibition, 255-261
 ribozyme cleavage of, 263, 276
 dsRNA unwinding/modifying activity and, 247-248
 TIMP, 70-72
 translation blockage, 251-252
- Rous sarcoma virus (RSV), 9, 102, 345
- S**100 β , *See* Glial cell protein
- Small cell lung carcinoma, 37
- T**-cell receptors (TCR), 193-197
 antisense study of, 197-201
- T cells
 antisense DNA and, 198-202
 antisense RNA activation of, 288-289
 apoptosis of, 193-197
- TGF- β , *See* Transforming growth factor β
- TIMP, *See* Tissue inhibitor of metalloproteinases
- Tissue inhibitor of metalloproteinases (TIMP) gene
 expression of, 70-72
 inhibition of, 280-282
- Transfection, *See also* Transferrinfection
 antisense RNA in, 124-125
 and antisense RNA production, 159
 with DNA, 343
 of HeLa cells, 142
 in macrophage suppression, 14
 of melanoma cells, 293-294
 of mouse hepatocytes, 142
 of tissue culture cells, 151
- Transferrin conjugates, 136-139, 141-147, 150-152
- Transferrinfection
 adenovirus in, 137-141, 143-152
 DNA in, 136-138, 141-152
 in gene construct expression, 142-152
- Transformation reversal, 124-134
- Transforming growth factor β , 315-317
- Triple helix, *See* Triplexes; Triplex formation
- Triplexes, 1
 gene expression control by, 27-35
 transcription control by, 32-35
- Triplex formation, 28-32, 342
 base triples, 28-29
 and c-myc transcription, 57-63
 DNA in, 1, 27-35, 342
 in vitro, 57-58
 in vivo, 58
 kinetics of, 30-31
 Matagens and, 159, 172-175
 oligonucleotides in, 28-32, 159, 172-175
 and oncogene transcription, 57-63
 protooncogenes in, 57-63
 specificity of, 30
 stabilization of, 31-32
 third strand orientation of, 29-30
- Triplex orientation, 28-32
- Tumor suppressor gene, *See* Deleted in colorectal cancer gene
- V**iral infections, *See also* specific viruses
 antisense DNA and, 2, 8-10, 339-341
 antisense oligonucleotides and, 101-102, 108-111, 334-335, 339-341, 345
 antisense RNA and, 2, 5-10, 268-270
 antisense strategy and, 164-167, 318-320, 331, 345
 antisense treatment for, 2, 8-10
 Matagens and, 164-166, 172-175
- Wilms' tumor, 37